

CHAPTER 10

Function Operations

Unit 1 (Pre-Calculus 12)

Lesson 10.1: Sums and Differences of Functions

↳ To combine two functions, $f(x)$ and $g(x)$, simply add or subtract as follows:

Sum

$$(f + g)(x) = f(x) + g(x)$$

Difference

$$(f - g)(x) = f(x) - g(x)$$

Think About:

- « Given two functions $f(x)$ and $g(x)$
- « Determine the combined equation of the function
 $h(x) = f(x) + g(x)$ or $h(x) = f(x) - g(x)$
- « Sketch the graph of $f(x)$, $g(x)$, and $h(x)$
- « State the domain and range

Sums of Functions

→ Adding the y -values of two functions, at corresponding values of x , produces a new function.

Algebraically

$$f(x) = 2x + 1$$

$$h(x) = f(x) + g(x)$$

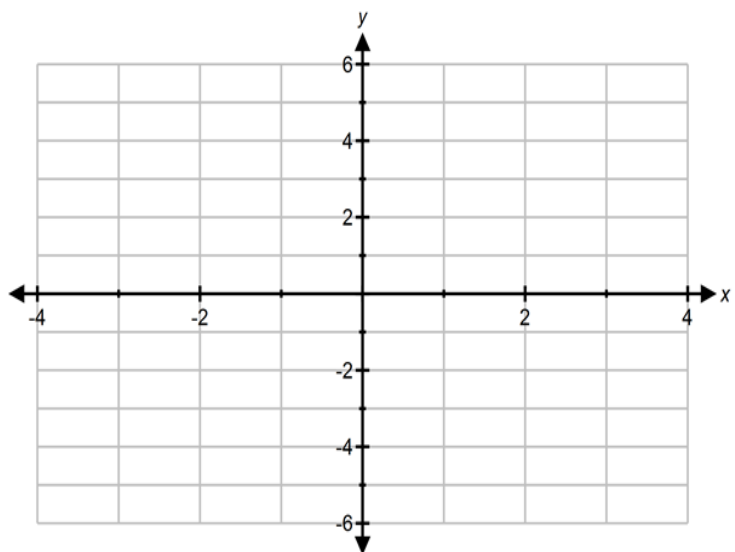
$$g(x) = x^2 - 4$$

$$h(x) =$$

Numerically

x	$f(x)$	$g(x)$	$h(x)$
-2			
-1			
0			
1			
2			

Graphically



Domain of $h(x)$ is the domain common to both $f(x)$ and $g(x)$

Domain:

Range:

Differences of Functions

→ Similarly, subtracting the y -values of two functions, at corresponding values of x , also produces a new function.

Algebraically

$$f(x) = 2x + 1$$

$$h(x) = f(x) - g(x)$$

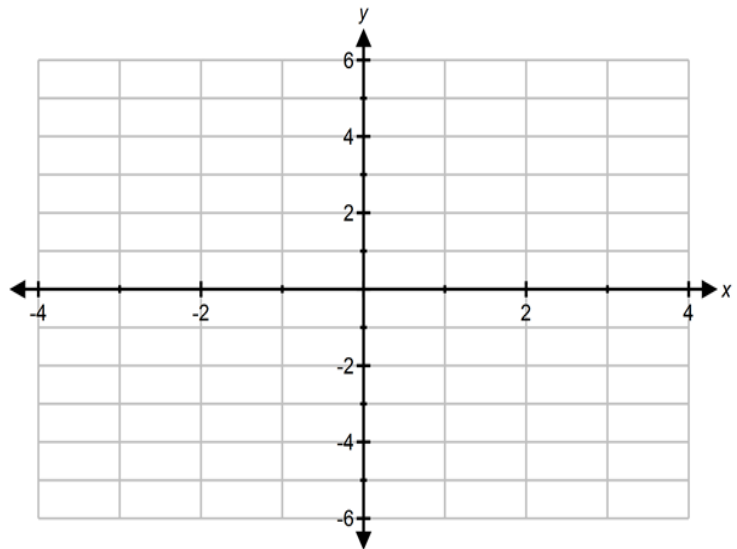
$$g(x) = x^2 - 4$$

$$h(x) =$$

Numerically

x	$f(x)$	$g(x)$	$h(x)$
-2			
-1			
0			
1			
2			

Graphically



Domain:

Range:

Lesson 10.1 Sum and Difference of Functions

Example 1

Consider the functions $f(x) = x^2 - 2x$ and $g(x) = x + 1$

(i) Algebraically determine an equation for $h(x) = (f + g)(x)$

(ii) Complete the given table of values for $f, g,$ and h

(iii) Sketch a graph of $h(x)$ on the set of axes provided. State the domain and range.

Equation

$$f(x) = x^2 - 2x$$

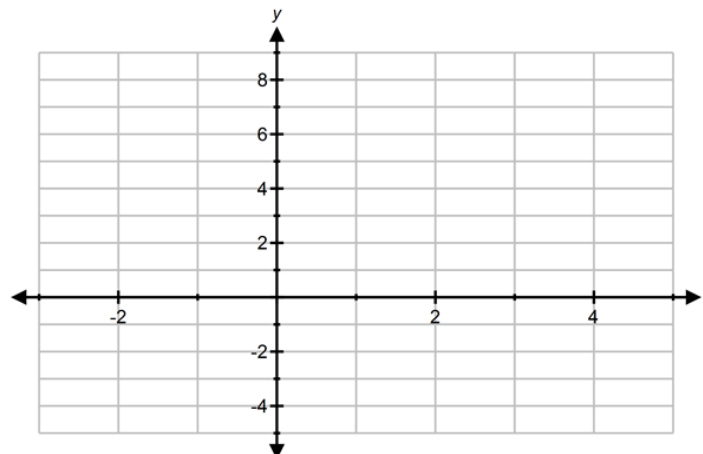
$$g(x) = x + 1$$

$$h(x) =$$

Table of values

x	$f(x)$	$g(x)$	$h(x)$
-2			
-1			
0			
1			
2			

Graph



Domain:

Range:

Lesson 10.1 Sum and Difference of Functions

Example 2

Consider the functions $f(x) = \sqrt{x-1}$ and $g(x) = x-3$

- Algebraically determine an equation for $h(x) = (f - g)(x)$
- Complete the given table of values for f , g , and h
- Sketch a graph of $h(x)$ on the set of axes provided. State the domain and range.

Equation

$$f(x) = \sqrt{x-1}$$

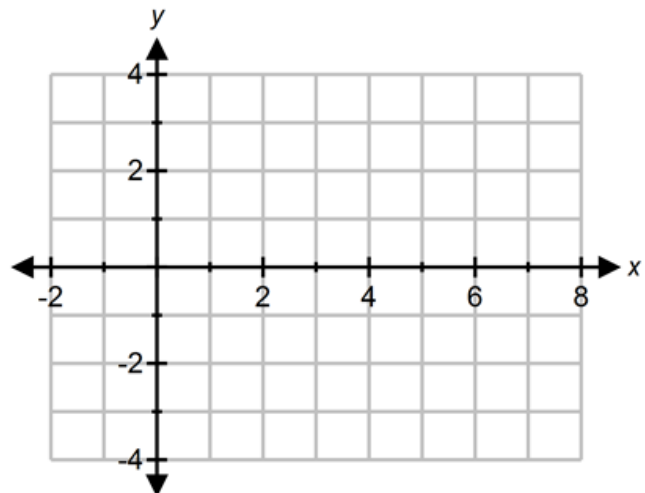
$$g(x) = x - 3$$

$$h(x) =$$

Table of values

x	$f(x)$	$g(x)$	$h(x)$
-1			
0			
1			
2			
5			

Graph



Domain:

Range: